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Subcommittee on Oversight and Investigations
On
NNSA's Global Threat Reduction Initiative
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- Thank you for this opportunity to discuss the nonproliferation activities of the U.S. Department of Energy's National Nuclear Security Administration (NNSA). In the past, nuclear non-proliferation focused on preventing non-nuclear weapon states from acquiring such weapons. That's still important, of course. In the aftermath of 9/11, we have intensified our efforts to keep nuclear material and nuclear weapons out of the hands of terrorists. The NNSA has accelerated and expanded its implementation of a five-pronged strategy to deny terrorists and states of concern the materials, technology, and expertise needed to develop nuclear weapons.

- **First, we want to account for and secure nuclear material in Russia and the former Soviet Union.** We are making progress in improving security measures at facilities in Russia and the former Soviet Union. We have accelerated our programs to secure an estimated 600 metric tons of weapons-usable material in Russia. To date, we have secured over 75 percent of the sites where these materials are stored and we are on course to finish this work by 2008 – a full two years ahead of the schedule established prior to 2001. We will complete our work to secure Russian Navy warhead and nuclear fuel sites by 2006. We are moving rapidly to identify and

secure all remaining 12th Main Directorate and Strategic Rocket Forces warhead sites. We expect to complete work on the Strategic Rocket Force sited by the end of 2007. Also, as discussed at the recent Bratislava Presidential Summit, we are exploring ways to accelerate our schedule in securing the 12th Main Directorate sites.

- **Second, we want to establish a capability to detect the movement or trafficking of weapons usable nuclear materials.** Through our programs like Second Line of Defense and Megaports, we are working with select countries to install radiation detection equipment at key transit choke points throughout the world – such as sea ports, airports, and land border crossings -- to detect proliferation and trafficking of nuclear and radioactive materials. We currently operate more than 50 land border crossings and have already equipped two seaports, with 3 more expected this year.

- **Third, we want to stop the production of new fissile material in Russia and eliminate existing stockpiles.** Russia currently operates three plutonium producing reactors, which – together – make 1.2 MT of plutonium each year. That's enough for roughly a couple of warheads a week. The U.S. has agreed to build replacement, coal fired plants to make it possible for Russia to shut down these reactors. We are making progress in this area as well. In February, we began work at the first site, Seversk.

- **We are also working to eliminate existing material.** More than 231 metric tons of Russia's HEU has been converted to non-weapons grade material for use in

commercial power reactors under what is often called the "Megatons to Megawatts" program. Altogether, 500 metric tons of Russia's HEU will be converted and used as fuel in civilian nuclear power plants. The U.S has declared 174 metric tons excess at we are currently down-blending this material at U.S. facilities. Additionally, through our plutonium disposition program, we are working with the Russians to eliminate 68 metric tons of weapons-grade plutonium -- 34 metric tons in each country -- enough for over 17,000 nuclear weapons.

- **Fourth, we want to eliminate or consolidate the remaining weapons-useable nuclear and radiological materials that exist throughout the remainder of the world.** This past May, DOE launched the Global Threat Reduction Initiative (GTRI) to identify, secure, recover and/or facilitate the disposition of vulnerable, high-risk nuclear and radioactive materials that pose a threat to the international community, *as quickly and expeditiously as possible*. GTRI works to achieve this mission by converting targeted research reactors around the world from the use of highly-enriched uranium (HEU) fuel to low enriched uranium (LEU) fuel, repatriating Russian- and U.S.-origin HEU fuel, securing and/or disposing of vulnerable, high-risk radiological materials that pose a threat to the United States, and identifying and addressing nuclear and radiological materials not previously addressed by existing nonproliferation efforts, the so-called "gaps".

- There is a good reason we are so concerned with the materials mentioned above – particularly HEU and plutonium. If terrorists were to get access to plutonium or

HEU, they would have overcome a significant step in the pathway to a full weapon. The International Atomic Energy Agency estimates that about 25 kg of highly enriched uranium is enough to manufacture a nuclear explosive device. That's why civilian research reactors that possess HEU are a new and time-critical focus of GTRI.

Prioritization

- DOE prioritizes its work under GTRI by applying a risk-based approach to identify vulnerable nuclear and radiological materials that pose a threat to the United States and the international community. This risk-based approach is informed by several criteria, including, but not limited to the type and quantity of material, security conditions at the site, and location of material. However, participation under GTRI is voluntary in nature. Therefore, diplomatic breakthroughs or voluntary offers by countries may also impact GTRI's prioritization and schedule. This approach is applied to all sites, countries, and regions prior to GTRI taking action and committing resources.

- Because participation in GTRI programs is voluntary, NNSA's success in achieving the objectives of each individual program is contingent upon reaching diplomatic agreement with each individual country on the best path forward to address their high-risk nuclear material.

- To help ensure that GTRI was prioritizing its efforts in the most effective way, DOE undertook a comprehensive worldwide survey entitled "Global Materials Removal and Research Reactor Security Study" (GMRRSS). This study, which drew from both classified and unclassified data, focused on research reactors and associated facilities given the large number of research reactors in the world that still operate with HEU. The study was coordinated with the U.S. interagency, including the Department of State and the National Security Council, and is intended to serve as a "living document" that will be updated as new information becomes available.

- Based on the results of the study and our risk-based approach to identify high-risk, vulnerable nuclear and radiological materials, GTRI is targeting several countries of highest concern. We will continue to work closely with the Department of State and the NSC to implement a coordinated DOE action plan.

- I would next like to go into a little more detail about our GTRI program elements – first, specifically focusing on our efforts to eliminate use of the several metric tons of HEU that exist at research reactors throughout the world.

Reduced Enrichment for Research and Test Reactors

- The Reduced Enrichment for Research and Test Reactors, or RERTR, program mission is to minimize and, to the extent possible, eliminate the use of HEU in civil nuclear applications by working to convert research reactors and radioisotope

production processes to the use of LEU fuel and targets throughout the world. Specifically, GTRI is:

1. Developing advanced, high-density LEU fuels;
2. Providing assistance to research reactors for feasibility studies, conversion analysis and licensing support;
3. Converting research reactors to the use of LEU fuel; and
4. Developing and demonstrating LEU-based radioisotope production techniques.

- We are currently targeting 105 research reactor around the world for conversion to LEU fuel under the RERTR program. Of these 105 reactors, 40 have already converted, 35 can convert with available LEU fuels, and 30 cannot convert with available LEU fuels. To address this, we are accelerating our work to develop higher-density LEU fuel in order to enable the conversion of these 30 reactors –the FY05 RERTR budget is more than double that of the preceding year. We have also set an aggressive goal of 2014 to complete conversion of all 105 targeted research reactors to LEU fuel.

- Another important development under RERTR is that, beginning in FY05, GTRI is working to convert two domestic university research reactors to the use of LEU fuel – one at the University of Florida and the other at Texas A&M. Former Secretary Abraham pledged under GTRI to achieve the conversion of all U.S. domestic research reactors by 2013.

Recovering and Repatriating Highly-Enriched Nuclear Fuel

- In addition to our reactor conversion efforts, we have two complementary programs that focus on the recovery and repatriation of research reactor nuclear fuel containing HEU. The Russian Research Reactor Fuel Return (RRRFR) program ensures that Russian-origin HEU fresh and spent fuel at foreign research reactors is returned to Russia and the Foreign Research Reactor Spent Nuclear Fuel Acceptance program ensures that U.S.-origin HEU spent fuel is returned to the United States. Both of these efforts work closely with our RERTR program to reduce and eventually eliminate the use of HEU in civilian nuclear research reactors and related facilities throughout the world.

The Russian Research Reactor Fuel Return (RRRFR) Program

- The United States, the Russian Federation and the International Atomic Energy Agency (IAEA) have identified more than 20 research reactors in 17 countries that have Soviet-/Russian-supplied nuclear fuel that is eligible under the RRRFR program. The Uzbekistan fresh HEU fuel shipment featured in a February CBS "60 Minutes II" piece is a perfect example of the tangible results being achieved in this program.

- Those countries that wish to participate in the RRRFR program must agree either to shut down their research reactors or to convert them from the use of HEU to LEU fuel as soon as suitable LEU fuel can be licensed and made available. Under an aggressive schedule established by the former Secretary of Energy, we are

accelerating repatriation of both fresh and spent HEU fuel under the RRRFR program. For instance, based on Secretarial commitments, we hope to complete the repatriation of all Russian-origin spent HEU fuel by the end of 2010. This schedule represents a significant acceleration of the original timelines – a full three years ahead of the original schedule.

- Just this past April, I co-chaired the first "Joint Coordinating Committee Meeting on Russian Research Reactor Fuel Return" meeting with my Russian counterpart, Ivan Kamenskikh. We agreed to an action/prioritization plan for Russian fuel return that should help us meet our aggressive schedule.

- To date, we have repatriated a total of 105 kilograms of fresh HEU, enough for four bombs according to the unclassified IAEA estimate. Russian-origin HEU has been repatriated to Russia from: Serbia in August 2002 (48 kilograms); Romania in September 2003 (14 kilograms); Bulgaria in December 2003 (17 kilograms); Libya in March 2004 (17 kilograms); Uzbekistan in September 2004 (3 kilograms); and most recently, the Czech Republic in December 2004 (6 kilograms). Numerous other shipments are being planned, including a shipment this week of fresh HEU and our first shipment of spent HEU nuclear fuel from Uzbekistan.

- Overall, by 2010 we expect to repatriate 1,370 kilograms of Russian HEU, thereby securing it from possible diversion for malevolent purposes.

The Foreign Research Reactor Spent Nuclear Fuel (FRR SNF) Acceptance Program

- Under the FRR SNF Acceptance Program, U.S.-origin fuel from research reactors in over 40 countries is eligible to be returned to the United States. About 20 metric tons of material is eligible for return under the current FRR SNF Acceptance Program. To date, a total of 6,445 fuel assemblies have been returned to the United States under this voluntary program, thereby reducing civil use of HEU by almost 500 kilograms. Over the last year and a half, we have repatriated to the United States 418 SNF assemblies from Japan, 293 SNF assemblies from Indonesia, and 126 SNF assemblies from Germany.

- This past November, the Secretary of Energy extended the deadline for participation in the FRR SNF Acceptance Program by ten (10) years. Prior to this extension, a number of countries did not participate in this program because of concerns surrounding the potential economic, financial, or scientific impact of returning the spent fuel. This extension will prevent disruptions of important research reactor operations, and permit continued fuel acceptance until suitable replacement LEU fuels are qualified and available.

- By 2019, the FRR SNF Acceptance Program expects to return or validate acceptable disposition of 22,743 U.S.-origin spent fuel assemblies from foreign research reactors.

Radiological Threat Reduction

- In addition to addressing the problem of terrorist acquisition of nuclear weapons, GTRI encompasses two programs that reduce the ability of terrorists to obtain material for a Radioactive Dispersal Device (RDD) or "dirty bomb." An RDD disperses radioactivity using conventional explosives or other means and the RDD threat has only been taken seriously since the advent the Global War on Terrorism. The two components of this work in GTRI include a domestic program to recover excess and unwanted radiological sources that are most vulnerable to diversion or theft and an international program to assist foreign countries in securing their vulnerable, high-risk radiological sources.

- Our radiological threat reduction programs address ten radioactive isotopes that pose a threat for use in an RDD. These isotopes are americium-241, californium-252, cesium-137, cobalt-60, curium-244, iridium-192, plutonium-238, plutonium-239, radium-226, and strontium-90.

U.S. Radiological Threat Reduction

- The U.S. Radiological Threat Reduction Program has the mission of recovering vulnerable radiological materials in the United States that could be used in a RDD. Originally, the DOE Office of Environmental Management managed this program, which in 1993 began to recover certain radioactive materials that had no commercial

disposition path. But, the recovery program was oriented towards environmental, health and safety concerns. In response to the threat of radiological terrorism, this program was transferred into NNSA, and priority was give to radiological materials that would be most dangerous if used by a terrorist. The program successfully recovered over 5,500 sealed sources in an 18-month period between October 2002 and March 2004, as mandated by Congress. To date, over 10,500 excess domestic sealed sources have been recovered and securely stored or disposed. This includes several notable accomplishments:

1. We removed 68 high-risk sources from 55 sites in Boston and New York prior to the national conventions;

2. Most recently, we recovered approximately 1000 curies of cesium-137 from 5 high schools.

- We estimate that there will be more than an additional 15,000 sealed sources declared excess that meet our threshold criteria and would be available for our program to address over the next 5 years.

International Radiological Threat Reduction

- The International Radiological Threat Reduction (IRTR) Program identifies, secures, and/or facilitates the disposal of vulnerable, high-risk radiological materials located

around the world to reduce the threat of a radiological attack against the United States or its interests. IRTR is currently engaged in over 40 countries.

- Bilateral cooperation under IRTR is buttressed by cooperation with the International Atomic Energy Agency, regional partners such as Australia, and with Interpol. The IRTR has been a primary source of assistance to the IAEA's new Office of Nuclear Security and had considerable involvement in working with Greece to protect against radiological terrorism during the Olympics. This program also had a major role in the recovery of a very large quantity of radiological material from Iraq. Since the program's inception, we have completed radiological security enhancements at 125 facilities worldwide and have recovered 63 Russian civilian Radioisotope Thermoelectric Generators (RTGs). Thus far, in FY05 alone, we have secured 56 sites in countries such as Belarus, Colombia, Indonesia, Kazakhstan, Russian, and Ukraine.

- There are at least 16 additional high-risk countries with over 100 facilities that IRTR will address over the next few years.

Paths Forward

- Under GTRI, we have aggressive plans in all of these areas. In FY05, GTRI plans to:

1. Convert five research/test reactors around the world from HEU to LEU fuel, in countries such as the Czech Republic.

2. Repatriate to Russia 76 kilograms of fresh and/or spent HEU fuel from Soviet-/Russian-supplied research reactors including fresh HEU from Latvia, the Czech Republic, and Libya.

3. Return 359 fuel assemblies containing U.S.-origin spent fuel from foreign research reactors in countries such as the Netherlands and Sweden.

4. Recover 1,500 U.S. excess sealed sources in the United States in FY05.

5. Secure 105 high-priority international sites with vulnerable radiological material at high-risk sites in countries such as Colombia, Ukraine, Jordan, Nicaragua, Belarus, Kazakhstan, and Yemen.

- In FY 2006, GTRI plans to:

1. Convert four research/test reactors around the world from HEU to LEU fuel.

2. Repatriate to Russia 130 kg of fresh and/or spent fuel from Soviet-/Russian-supplied research reactors.

3. Return 472 assemblies containing U.S.-origin spent fuel from foreign research reactors.

4. Recover 2,250 U.S. excess sealed sources in the United States.

5. Secure 125 high-priority international sites with vulnerable radiological materials.

- The specific details of our strategies and future plans in the remainder of FY05 and in FY06 identify specific locations that may have vulnerabilities; we and our international colleagues consider this information sensitive. We would be happy to provide more specific details in closed testimony.

Conclusion

- I would like to thank you for this opportunity to discuss DOE's Global Threat Reduction Initiative with you.